Amendments to the Specification:

Please replace lines 9 - 28 of page 26 with the following:

- (1) U.S. Non-Provisional Patent Application No. 09/708,883 entitled "Techniques For Dispensing Postage Using A Communication Network", filed February 9, 2000 (Attorney Docket No. 006969-022320US); (2) U.S. Non-Provisional Patent Application No. <u>09/708,975</u> entitled "Method Of Distributing Postage Label Sheets With Security Features", filed November 7, 2000-(Attorney Docket No. 006969-025510US); _(3) U.S. Non-Provisional Patent Application No. / , entitled "Method And Apparatus For Providing Postage Indicia Over A Data Communication Network" (Attorney Docket No. 006969-025400US); ([[4]]3) U.S. Non-Provisional Patent Application No. 09/708,698– entitled "System And Method For Managing Multiple Postage Functions In A Single Account", filed November 7, 2000-(Attorney Docket No. 006969-021210US); (54) U.S. Non-Provisional Patent Application No. <u>09/708,792</u>—/ entitled "Targeted Advertisement Using A Security Feature On A Postage Medium", filed November 7, 2000 (Attorney Docket No. 006969-025520US); (65) U.S. Non-Provisional Patent Application No. <u>09/708,185</u> entitled "System And Method Of Printing Labels", filed November 7, 2000 (Attorney Docket No. 006969-025610US); and (76) U.S. Non-Provisional Patent Application No. 09/708971 entitled "Providing Stamps On Secure Paper Using A Communications Network", filed November 7, 2000-(Attorney Docket No. 006969-022220US).; (7) U.S. Non-Provisional Patent Application No. 09/611,375, entitled "Providing Stamps On Secure Paper Using A Communications Network," filed July 7, 2000; (8) U.S. Provisional Patent Application No. 60/216,779, entitled "System And Method Of Printing Labels," filed July 7, 2000; (9) U.S. Provisional Patent Application No. 60/216,653, entitled "Method And
 - (10) U.S. Provisional Patent Application No. 60/206,207, entitled "Providing Stamps on Secure Paper Using A Communications Network" filed May 22, 2000;

System For Dispensing Postage Over The Internet, With Enhanced Postal

Security Features" filed July 7, 2000;

- (11) U.S. Provisional Patent Application No. 60/204,357, entitled "Stamps Over a Communications Network" filed May 15, 2000;
- (12) U.S. Provisional Patent Application No. 60/181,299, entitled "System and Method For Stamps Over The Internet," filed February 9, 2000; and
- (13) U.S. Provisional Patent Application No. 60/181,368, entitled "System and Method For Stamps Over The Internet," filed February 8, 2000.

Please replace the two paragraphs beginning on line 23 of page 6 with the following amended paragraphs:

Each user (client) 132, 134 typically comprises a conventional personal computing machine (PC) running conventional user software (not shown). Typical PC's include MacintoshMACINTOSH® PC's from Apple Computer, Inc., IntelINTEL®-compatible PC's, and so on. Data servers 102 and 104 are typically high-end computing machines capable of high speed operation and much higher data storage capacity than typical PC's. Computing systems suitable for user machines and server systems are well known and do not require additional discussion to one of ordinary skill in the art.

Similarly, server software and user software systems are known. In the following discussion, the illustrative embodiment of the present invention uses the World Wide Web, and so the user software is a component referred to as a "web browser." For example, Netscape Navigator NAVIGATOR® by Netscape Communication Corporation is a popular web browser. Another browser is Internet Explorer EXPLORER® by Microsoft Corporation.

Please replace the paragraph beginning on line 10 of page 7 with the following amended paragraph:

In accordance with the representative embodiment shown in Fig. 1, first server 102 is a web server, providing HTML-based content 112 to users 132, 134. The web server can be any data processing machine or machines running (executing) appropriate system and applications software such as the operating system (OS). Server software running on the first server provides the web content comprising the web pages which constitute a web site. Thus, for example, YahooYAHOO® is a web site comprising numerous web pages that can be accessed by a user. Large web sites typically have multiple server machines to provide adequate system throughput. Thus, each of the servers 102, 104 shown in Fig. 1 may in actuality be one or more physical machines, though logically each is viewed as a single server machine (system).

Please replace the paragraph beginning on line 29 of page 8 with the following amended paragraph:

Referring to Figs. 2 and 3, server software 212 running on first server 102, in accordance with the invention, includes functionality to provide a portal through which postage can be distributed from a postage vendor server to users visiting the site being maintained at the first server. For the discussion of the illustrative embodiment which follows, user 132 comprises a WINDOWS®-based OS (e.g., WINDOWS 95) provided by Microsoft Corporation, though it is understood that other OS technologies can be used.

Please replace the paragraph beginning on line 10 of page 11 with the following amended paragraph:

At step 309, the web site 102 initiates a download of a postage printing software component 202 to the user's system. The download of the postage printing software component preferably, but not necessarily, occurs concurrently with sending postage requests to the postage vendor server for efficiency reasons. The postage printing software component provides a specialized printing capability and printer interface for handling the eventual printing of the postage to produce the indicium. This aspect of the invention is more fully described in U.S. Provisional Patent Application No. 60/216,779, entitled "System And Method Of Printing Labels," filed July 7, 2000. [we should reference greg's non-provisional application covering this subject matter] The postage printing software component can be a print DLL (dynamically linked library) software component that is dynamically installed into the OS, a JavaJAVA® script that is downloaded and executed by the browser software, or other printing software implementations or techniques known to those of ordinary skill.

Please replace the paragraph beginning on line 6 of page 13 with the following amended paragraph:

In step 318, the information for printing the indicium (optionally enhanced to contain a background image) is then sent to the user at user system 232. The information received by the user is then used to print the indicium. For example, a printer device 142 coupled to the user system may be used to print the indicium (or indicia) 200. The postage printing software component 202 in the user receives the information and interacts with the user to print the postage, step 320. As mentioned above, the printing aspect of this invention is more fully described in U.S. Provisional Patent Application No. 60/216,779, entitled "System And Method Of Printing Labels," filed July 7, 2000, and

U.S. Non-Provisional Patent Application No. <u>09/708,185</u>—/_____, entitled "System and Method of Printing Labels" (Attorney Docket No. 006969-025610US). The postage printing software component 202 automatically initiates an interactive print sequence upon receiving the information, prompting the user through the steps to print out the received postage.

Please replace the paragraph beginning on line 5 of page 14 with the following amended paragraph:

When the off-line print program is initiated, it establishes a communication link to the Internet to obtain the postage printing software component 202. This component may reside on the first server 102, on the postage vendor server 104, or at some other convenient location on the Internet, or on a local network server. Alternatively, the postage printing software component can be hardcoded into to the off-line print program, or is already installed in the Windows OS as a print DLL. Preferably, the postage printing program is obtained from a location on the Internet and downloaded on a per-use basis. This allows for the postage printing program to be easily maintained and updated to provide new printing features, enhanced user interfaces, and so on. The off-line print program operates as described in U.S. Provisional Patent Application No. 60/216,779, entitled "System And Method Of Printing Labels," filed July 7, 2000, and U.S. Non-Provisional Patent Application No. 09/708,185—/______, entitled "System and Method of Printing Labels" (Attorney Docket No. 006969 025610US).

Please replace the 7 paragraphs beginning on line 1 of page 17 with the following amended 7 paragraph:

Fig. 7 depicts an expanded block diagram of postage vendor system 104 according to an embodiment of the present invention. As shown in Fig. 7, postage vendor system 104 may comprise one or more web servers 702, one or more postal security device module (PSDM) servers 704704-1, 704-2 (with associated cryptographic modules 706706-1, 706-2), and a database 708 coupled to a local communication network 710 via a plurality of communication links 712. Local communication network 710 provides a mechanism for allowing the various components of postage vendor system 104 to communicate and exchange information with each other. Local communication network 710 may itself be comprised of many interconnected computer systems and communication links. Communication links 712 may be hardwire links, optical links, satellite or other wireless communications links, wave propagation links, or any other mechanisms for communication of information. The configuration of postage vendor system 104 depicted in Fig.

7 is merely illustrative of an embodiment incorporating the present invention and does not limit the scope of the invention as recited in the claims. One of ordinary skill in the art would recognize other variations, modifications, and alternatives.

Web server 702 may host the postage vendor's web site and store web pages provided by the postage vendor. Web server 702 is responsible for receiving URL requests from user systems 232232-1, 232-2 and for forwarding web pages corresponding to the URL requests to the requesting user systems 232232-1, 232-2. As previously stated, these web pages allow a user to interact with postage vendor system 104. e.g. to configure a request to purchase postage from postage vendor system 104. When user system 232232-1, 232-2 requests communication with postage vendor system 104, web server 702 may be configured to establish a communication link between user system 232232-1, 232-2 and postage vendor system 104. For example, web server 702 may establish a secure Internet socket link. e.g. a SSL 2.0 link, between postage vendor system 104 and user system 232232-1, 232-2. As noted above, the information communicated between user system 232232-1, 232-2 and postage vendor system 104 may be SSL encrypted using various encryption levels, e.g. 40-bit encryption, 128-bit encryption, and the like. Web server 702 may also incorporate a firewall which shields the internal potage vendor system network from communications network 122 and user systems 232232-1, 232-2 and other resources coupled to communications network 122. According to an embodiment of the present invention, web server 702 is responsible for receiving requests from user systems 232232-1, 232-2 to purchase stamps and for performing load distribution and fail-over processing associated with the requests. Web server 702 may also be configured to control the downloading of printer control programs from postage vendor system 104 to user system 232232-1, 232-2.

Each PSDM server 704704-1, 704-2, in conjunction with one or more cryptographic modules 706706-1, 706-2 coupled to the PSDM server, is responsible for generating the information for printing the indicium in response to requests to buy postage received from one or more user systems 232232-1, 232-2. According to an embodiment of the present invention, functions performed by PSDM server 704704-1, 704-2 include functions performed by a Postal Security Device (PSD) as described in the IBIP specifications published by the USPS. For example, functions performed by PSDM server 704704-1, 704-2 include initialization and creation of PSD resources, digital signature generation, management of funds related to the postage dispensed by postage vendor system 104, generation of information for printing the indicia, key handling, and other functions. PSDM servers 704704-1, 704-2 are designed to operate in a clustered environment to allow for expandability to meet the needs of a rapidly growing user base. According

to an embodiment of the present invention, PSDM server 704704-1, 704-2 communicates with web server 702 using a DCOM (Microsoft's Distributed Component Object Model) interface.

Each PSDM server 704704-1, 704-2 may comprise one or more cryptographic modules 706706-1, 706-2 for performing cryptographic functions and for generating digital signatures. Various keys for performing security-critical functions such as digital signature generation, hashing, encryption, etc. are stored by cryptographic module 706706-1, 706-2. According to an embodiment of the present invention, cryptographic module 706706-1, 706-2 is a nCipher nFast/CA module which is validated to FIPS 140-1 Level 3 security.

According to the teachings of the present invention, PSDM server 704704-1, 704-2 uses PSD resources to generate indicia and to track monetary amounts related to the postage dispensed by postage vendor system 104. In order to increase the indicia generation throughput, a plurality of shared PSD resources may be used by PSDM servers 704704-1, 704-2 to generate the indicia. By using a plurality of PSD resources, multiple PSDM servers 704704-1, 704-2 can run concurrently, producing indicia in parallel without the bottleneck of sharing a single PSD resource.

According to an embodiment of the present invention, each PSD resource comprises a unique PSD identifier (e.g. a 4-byte identifier), a descending register (DR) value (e.g. a 4-byte value), an ascending register (AR) value (e.g. a 5-byte value), and a control code (e.g. a 20-byte value). The PSD identifier uniquely identifies each PSD resource. The ascending register (AR) value represents the total monetary value of all indicia ever produced by the PSD during its life cycle. The descending register (DR) value indicates the available funds assigned to the PSD resource which may be used to dispense postage. According to an embodiment of the present invention, the monetary values stored by the AR and DR values are measured in 1/10 of 1-cent increments as specified in the IBIP specifications. The control code is a secure hash of the PSD identifier, the PSD AR value, and the PSD DR value. According to an embodiment of the present invention, the control code is generated using HMAC-with-SHA1 (RFC 2104) using a secret HMAC key stored by cryptographic module 706706-1, 706-2.

According to the teachings of the present invention, monetary amounts related to the postage dispensed by postage vendor system 104 are tracked using a global PSD (GPSD) resource and a pool of PSD resources referred to as mini-PSDs (or MPSDs). According to an embodiment of the present invention, eight MPSD resources may be used by a single cryptographic module 706706-1, 706-2 associated with PSDM server 704704-1, 704-2 to concurrently generate information for printing indicia. The sum of the AR value and the

DR value of the GPSD represents the total amount of postage bought from the postal authority, for example, from the USPS, by the postage vendor provider (e.g. Neopost) of postage vendor system 104. The sum totals of the AR and DR values of the MPSD resources matches the AR and DR values of the GPSD resource. Information related to the GPSD resource and MPSD resources may be stored in database 708.

Please replace the 2 paragraphs beginning on line 5 of page 20 with the following amended 2 paragraphs:

Database 708 acts as a repository for storing information related to the postage dispensing process. For example, database 708 may store information related to the PSD resources (both GPSD and MPSDs), information used for generation of digital signatures, and other like information. Database 708 may also store information about users who have purchased postage from postage vendor system 104. Information related to users who have registered with postage vendor system 104, e.g. user account information, user preferences information, etc. may also be stored by database 708. Database 708 may also store the postal license number assigned to postage vendor system 104 by the postal authority. Other information related to the dispensing of postage may also be stored by database 708. The term "database" as used in this application may refer to a single database or to a plurality of databases coupled to local communication network 710. Further, database 708 may be a relational database, an object-oriented database, a flat file, or any other way of storing information. According to an embodiment, database 708 is coupled to web server 702 and to PSDM server 704-704-1, 704-2 via an ODBC interface.

Fig. 8 is a simplified flowchart 800 showing processing performed by the various components of postage vendor system 104 upon receiving a request to purchase postage according to an embodiment of the present invention. As shown in Fig. 8 processing is generally initiated when a user using user system 232232-1, 232-2 accesses one or more web pages provided by postage vendor system 104 (step 802). Requests to access web pages are generally received by web server 702 which responds by transmitting the requested web pages to requesting user system 232232-1, 232-2. As part of the communication, web server 702 may establish a SSL connection with user system 232232-1, 232-2. According to an embodiment of the present invention, web server 702 may also download a print control program, such as an ActiveX control or a Netscape plug-in, to user system 232232-1, 232-2. The control program may be executed to establish the SSL connection.

Please replace the paragraph beginning on line 3 of page 21 with the following amended paragraph:

According to an embodiment of the present invention, the user purchase request may be transmitted from user system 232-232-1, 232-2 to postage vendor system 104 in the form of a data structure in Extensible Markup Language (XML), and may comprise the following:

Please replace the 2 paragraphS beginning on line 10 of page 22 with the following amended 2 paragraphS:

It should be apparent that the above described data structure merely illustrates an example of the data and the data format which may be included in the user's request to purchase postage which is communicated from user system 232232-1, 232-2 to postage vendor system 104 and is not meant to limit the scope of this invention as recited in the claims. In alternative embodiments of the present invention, more or less information than that shown above may be included in the user request. Further, various different formats may be used for communicating the information to postage vendor system 104.

Web server 702 may then validate the purchase request received from user system 232232-1, 232-2 (step 806). As part of the validation step, web server 702 may check the validity of the user, the validity of credit-card information or other like information provided by the user, the validity of information identifying the medium on which the indicia are to be printed, e.g. sheet serial numbers and/or label serial numbers provided by the user, and validity of other information related to the purchase request. Various other validation checks may also be performed according to alternative embodiments of the present invention.

Please replace the 3 paragraphs beginning on line 9 of page 23 with the following amended 3 paragraphs:

Web server 702 then checks if any of the validation checks performed in step 806 failed (step 808). If any validation check failed, web server 702 may send a message back to the requesting user system 232232-1, 232-2 indicating that the validation was unsuccessful (step 810). The message communicated to user system 232232-1, 232-2 may also optionally provide reasons for the failure. The user may then be provided a chance to remedy the reason for the validation failure. For example, if the user is a registered user with a prefunded account, and web server 702 during the validation process determines that the user does not have sufficient funds in his/her account to pay for the requested postage, the user may be offered the choice of adding funds to the

account to enable the transaction to be completed, or the user may be allowed to change the purchase request such that the amended request falls within the limits of available funds. Likewise, if the user has inadvertently provided incorrect information e.g. credit card information, the user may be allowed to correct the information and resend the purchase request to postage vendor system 104.

If it is determined in step 808 that the validation checks performed in step 806 were successful, web server 702 then, based on the purchase request, determines the number of stamps for which information for printing the indicium have to be generated and the tasks for generating the information are allocated to one or more PSDM servers 704704-1, 704-2 (step 814). In this manner, web server 702 distributes the indicium related information generation work load among PSDM servers 704704-1, 704-2 coupled to local communication network 710. Web server 702 may use different allocation schemes/algorithms to distribute the work among PSDM servers 704704-1, 704-2.

According to an embodiment of the present invention, web server 702 maintains a list of all PSDM servers 704704-1, 704-2 coupled to local communication network 710. For example, a list of available PSDM servers 704704-1, 704-2 may be stored in the Windows NT registry of web server 702. A system administrator may add or remove PSDM servers using a Windows NT registry editor. According to another embodiment, a proxy software (e.g. C++) class may be provided which stores a list of the available PSDM servers 704704-1, 704-2. Information related to PSDM servers 704704-1, 704-2 may also be stored in database 708. Web server 702 may then use an allocation scheme such as a round-robin scheme to distribute the work. For example, if there are two PSDM servers available, web server 702 will alternate sending indicium printing information generation requests to the two PSDM servers. According to this embodiment, if the user has requested the purchase of two US\$0.33 stamps, the task of generating information for printing the indicium for the first US\$0.33 stamp will be allocated to the first PSDM server, and the task of generating information for printing an indicium for the second Us\$0.33 stamp will be allocated to the second PSDM server. In this manner, web server 702 makes optimal use of available PSDM servers 704704-1, 704-2. It should be apparent that various other allocations schemes/algorithms may also be used by web server 702.

Please replace the 9 paragraphs beginning on line 10 of page 25 with the following amended 9 paragraphs:

Referring back to Fig. 8, after the task to generate information for printing an indicium for a stamp has been assigned to a PSDM server 704704-1, 704-2,

> the PSDM server then selects a MPSD resource to be used for generating the information for printing the indicium (step 816). According to an embodiment of the present invention, when PSDM server 704704-1, 704-2 is initialized, for example during system startup, PSDM server 704704-1, 704-2 acquires exclusive rights to one or more MPSD resources stored in database 708 which will be used to service requests for indicia generation. In essence, PSDM server 704704-1, 704-2 "checks out" one or more MPSD resources from database 708. In a specific embodiment, each PSDM server 704704-1, 704-2 equipped with a cryptographic module 706706-1, 706-2 checks out up to eight MPSD resources. After obtaining exclusive rights to the pool of MPSD resources, PSDM server 704704-1, 704-2 goes online and waits for requests to generate information for printing indicia. Accordingly, when PSDM server 704704-1, 704-2 receives a request to generate information for printing an indicium from web server 702, PSDM server 704704-1, 704-2 selects one of the previously checked out MPSD resources for generating the information.

According to an embodiment of the present invention, as part of step 816, if no MPSD resources are available for use when requested from database 708, a new MPSD resource may be automatically generated. The new MPSD resource is assigned a unique identifier, its AR and DR values are set to zero, and a control code value is assigned to it. The requesting PSDM server 704704-1, 704-2 is then allowed to check out the new MPSD resource. A signal is communicated to PSDM server 704704-1, 704-2 indicating that the MPSD resource is new, and this causes PSDM server 704704-1, 704-2 to make a request to add funds (i.e. add funds to the DR value of the MPSD resource) to the MPSD resource to make it usable. The process of funding a MPSD resource is described below.

PSDM server 704704-1, 704-2 may then ensure that the selected MPSD resource has sufficient funds to satisfy the postage request (step 818). If the selected MPSD resource does not have sufficient funds to satisfy the postage request, then PSDM server 704704-1, 704-2 may perform processing to fund the selected MPSD resource. Further details regarding processing performed by PSDM server 704704-1, 704-2 to fund the selected MPSD resource are explained below-with respect to Fig. 10.

PSDM server 704704-1, 704-2 then generates the information for printing the requested indicium using the selected (and sufficiently funded) MPSD (step 820). PSDM server 704704-1, 704-2 adjusts the AR and DR values of the selected MPSD resource corresponding to the value of the requested stamp for which indicium is to be being generated. The AR value of the selected MPSD resource is increased by the amount of the stamp while the DR value of the selected MPSD resource is decreased by the stamp value. The AR and DR

values for the MPSDs along with other information related to the MPSDs may be stored in database 708.

The information for printing the indicium generated in step 820 includes a digital signature signed by cryptographic module 706706-1, 706-2 coupled to PSDM server 704704-1, 704-2. Several different digital signature algorithms may be used to generate the digital signature. These include algorithms identified in the IBIP specifications such the Digital Signature Algorithm (DSA), the Rivest Shamir Adleman (RSA) Algorithm, the Elliptic Curve Digital Signature Algorithm (ECDSA), and others. The digital signature methodology provides data integrity and non-repudiation services. According to an embodiment of the present invention, the digital signature generated by PSDM server 704704-1, 704-2 generally complies with the digital signature requirements specified in the IBIP specifications.

According to a specific implementation of the present invention, the digital signature is signed using a DSA private key, for example, a 1024-bit DSA key, stored by cryptographic module 706706-1, 706-2. Cryptographic module 706706-1, 706-2 may also store additional keys, such as a key used for hashing purposes, and others. According to an embodiment of the present invention, a Hash-based Message Authentication Code (HMAC) key is stored by cryptographic module 706706-1, 706-2 and used for hashing. In order to protect the identity of the private and other keys, cryptographic module 706706-1, 706-2 may use a master key to encrypt the stored keys. This master key is generally internally stored and cannot be exported in any way outside of cryptographic module 706706-1, 706-2. According to an embodiment of the present invention, a Triple Digital Encryption Standard (3DES) master key is used to encrypt the other keys.

The various keys stored by cryptographic module 706706-1, 706-2 are generally created when PSDM server 704704-1, 704-2 is initialized. The private key, hashing key, and other keys are created, encrypted using the master encryption key and then internally stored by cryptographic module 706706-1, 706-2. The public key corresponding to the private key used for signing the information for printing the indicium, for example a public DSA key corresponding to the private DSA key stored by cryptographic module 706706-1, 706-2, is then sent to the postal authority to receive a certificate serial number. The certificate serial number is stored in database 708 and used by PSDM server 704704-1, 704-2 in the indicium generation process.

As part of step 820, data related to the process of generating information for printing the indicium may be stored in database 708. For example, financial information, user information, and other information related to generation of information for printing the indicium may be stored in database 708 by PSDM server 704704-1, 704-2 and associated cryptographic module 706706-1, 706-

2. This information may be downloaded to postal authority system 160 at periodic intervals.

The information for printing the indicium generated in step 820 is then forwarded by PSDM server 704-704-1, 704-2 to web server 702 which communicates the information to requesting user system 232232-1, 232-2 (step 822). As described above, according to an embodiment of the present invention, PSDM server 704-704-1, 704-2 may use a DCOM interface (e.g. the *IPSDStation* interface described above) to forward the generated indicium to web server 702. For example, a call to the "CreateIndicium" API (described above) returns a pointer to an Indicium structure which is included in the information for printing the information and which contain data representing the indicium. The contents of the Indicium data structure may include:

Please replace the paragraph beginning on line 4 of page 29 with the following amended paragraph:

The information for printing the indicium downloaded to requesting user system 232232-1, 232-2 may include various types of information representing the indicium (or indicia). According to an embodiment of the present invention, a bitmap or a graphical image representing the indicium may be included in the information for printing the indicium. According to another embodiment of the present invention, indicium data or a data structure comprising information representing the indicium may be included in the information for printing the indicium. According to yet another embodiment of the present invention, a data structure in XML format may be included. The XML format for the data structure may be as follows:

Please replace the paragraph beginning on line 39 of page 29 with the following amended paragraph:

The information for printing the indicium received by user system from postage vendor system 104 may then be printed using a printer device coupled to user system 232232-1, 232-2. The information may also be stored on a computer-readable storage media for subsequent printing of the indicium. In a specific embodiment of the present invention, user system 232232-1, 232-2 may convert the indicium data included in the information for printing the indicium to an indicium before printing. As previously stated, the indicium may be printed on any medium such as a label, sheet of labels, sheet of paper, directly on the mail piece itself, on an envelope, card, etc., but in preferred embodiments the indicia are printed on serialized label stock, possibly incorporating additional security features.